

WHAT IS CLAIMED IS:

1. A rotating machine comprising:
a stator having a plurality of field winding slots;
a plurality of field windings disposed in each of the field winding slots, at
5 least two of the field windings are comprised of:
an outer jacket; and
a plurality of conductive wires disposed within and enclosed by the
outer jacket such that longitudinal passages are defined therebetween; and
circulation means for circulating a coolant into and from the rotating
10 machine through the longitudinal passages.

2. The rotating machine of claim 1, further comprising a housing, the
housing having a cavity for acceptance of the stator therein, the housing and stator defining
first and second plenums at first and second ends of the stator, the coolant entering the
rotating machine into the first plenum and exiting the rotating machine from the second
15 plenum.

3. The rotating machine of claim 2, wherein the at least two field windings
having the longitudinal passages further having at least one entry hole in the outer jacket
providing communication between the longitudinal passages and the first plenum and at
least one exit hole in the outer jacket providing communication between the longitudinal
20 passages and the second plenum, wherein the coolant enters the longitudinal passages from
the first plenum through the at least one entry hole and exits into the second plenum
through the at least one exit hole.

4. The rotating machine of claim 2, wherein the at least two field windings
having the longitudinal passages further having an exit hole in the outer jacket which
25 provides communication between the longitudinal passages and the second plenum, the
coolant leaving the longitudinal passages through the exit hole into the second plenum for

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re-circulation into the first plenum, the first and second plenums being connected with an external conduit.

5. The rotating machine of claim 4, wherein the circulation means comprises a pump disposed in the external conduit between the first and second plenums.

5 6. The rotating machine of claim 4, further comprising a heat exchanger disposed in the external conduit between the first and second ends for removing heat from the coolant re-circulated therein.

7. The rotating machine of claim 1, wherein each of the plurality of field windings has the outer jacket and longitudinal passages.

10 8. The rotating machine of claim 1, wherein the outer jacket is a flexible elastomer.

9. The rotating machine of claim 1, wherein the plurality of conductive wires disposed within the jacket are circular in cross-section.

15 10. The rotating machine of claim 9, wherein the conductive wires are wound within the outer jacket to form helical shaped longitudinal passages.

11. The rotating machine of claim 1, wherein the outer jacket comprises at least one film disposed over the conductive wires.

20 12. The rotating machine of claim 1, further comprising impregnant disposed in the slots to seal the spaces between adjacent outer jackets and between the outer jackets and walls of the slots.

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13. A rotating machine comprising:
a stator having a plurality of field winding slots;
a plurality of field windings disposed in each of the field winding slots, the
plurality of field windings comprising:
5 an outer jacket only partially contiguous with walls of the field
winding slots; and
a plurality of conductive wires disposed within the outer jacket such
that longitudinal passages are defined therebetween; and
circulation means for circulating a coolant into and from the rotating
10 machine through the longitudinal passages.